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not sensibly affected by the presence of the fungus in the substratum or in its surface. Placed subsequently in conditions which were eminently suitable to the development of the parasitic form, they resisted its action perfectly, though control plants which had not been cultivated in the ground infected by the attenuated form were killed very quickly. From their experiments the authors claim to have shown that the form of *Botrytis cinerea* intermediate between the gonidial and the sterile form can make plants immune to the attacks of the latter.

Researches of a somewhat kindred nature dealing with the infection of particular plants by specific fungi have been communicated recently to this section by Professor Marshall Ward in his paper read last year on the bromes and their brown rust. They brought to light many very important facts connected with the question of adaptive parasitism and immunity. Few questions in vegetable physiology can compare in economic importance with these when we think of their possible development in relation to agriculture.

I have now somewhat hurriedly surveyed certain parts of the field of vegetable physiology. It has been impossible in an address like this to do more than indicate what seem to me some of the more important problems awaiting investigation. May we hope that all such work will be vigorously conducted, but that the conclusions reached will be scrutinized with the greatest care and subjected to repeated examination? Great hindrances to the advance of the science resulted from dogmatic assertions made by eminent men in the past, their personal influence having led to their conclusions, not altogether accurate, being nevertheless almost universally accepted. Many years subsequently these conclusions have needed reexamination, the result being the destruction of a whole fabric that

had been reared upon this unworthy foundation. I may close, as I began, by an appeal to the younger school of botanists to take some of this work in hand, and by assiduous and critical experiment and observation to contribute to the solution of the problems pressing upon us in this field.

J. REYNOLDS GREEN.

CAMBRIDGE UNIVERSITY.

AMERICAN ORNITHOLOGISTS' UNION.

THE Twentieth Congress of the American Ornithologists' Union convened in Washington, D. C., Monday evening, November 17. The business meeting of the fellows was held at Dr. Merriam's residence, and the public sessions, commencing Tuesday, November 18, and lasting three days, were held at the U. S. National Museum.

Dr. C. Hart Merriam, of Washington, D. C., was reelected president; Charles B. Cory, of Boston, and C. F. Batchelder, of Cambridge, Mass., vice-presidents; John H. Sage, of Portland, Conn., secretary; William Dutcher, of New York City, treasurer; Frank M. Chapman, Ruthven Deane, E. W. Nelson, Witmer Stone, Drs. A. K. Fisher, Jonathan Dwight, Jr., and Thos. S. Roberts, members of the Council.

The ex-presidents of the Union, Dr. J. A. Allen and Messrs. William Brewster, D. G. Elliot and Robert Ridgway, are *ex-officio* members of the council.

Harry C. Oberholser, of Washington, D. C., was elected a fellow; Ernst Hartert, of England, and John A. Harvie-Brown, of Scotland, honorary fellows; A. J. Campbell, of Melbourne, W. P. Pycraft, of London, Dr. H. von Ihering, of Brazil, and Alfred J. North, of Sydney, N. S. W., corresponding fellows. Thirteen associates were elected to the class known as members, and eighty-four new associates were elected.

Mr. Witmer Stone, in his paper entitled 'A Glance at the Historical Side of the Check-List of North American Birds,' referred to the help accorded by the earlier ornithologists in making a check-list possible, and gave in detail the number of species described by each. Dr. Allen traced the history of the present A. O. U. check-list from its inception and spoke of its future.

Much discussion ensued and many inquiries were made regarding the protection of birds. The report of the committee having this matter in charge showed that satisfactory results had been obtained during the past year, and that interest in the preservation of wild bird life was not lacking at the present time. Dr. Bishop spoke of the slaughter by marketmen and milliners' agents of the species found along the coast of North Carolina, and Mr. Dutcher remarked on the proposed legislative bills for the preservation of such birds. Dr. Palmer told of the immense number of ducks annually taken to the northern markets from the North Carolina coast. He thought the upland as well as the shore birds needed protection. Professor T. Gilbert Pearson referred to the destruction of bob-white in his state (North Carolina), and of the illegal methods used in transporting them north.

Mr. Chapman compared the bird-life of Gardiners Island, N. Y., and Cobbs Island, Va., accompanying his remarks with lantern slides. As a result of rigid protection birds are abundant on the former island, while at the latter island, for want of suitable protection, they are nearly exterminated.

Mr. George Spencer Morris gave many facts relating to the life of Edward Harris, the friend of Audubon, and read extracts from his unpublished journals. It was an important contribution to the historical side of ornithology.

The Union sustained a severe loss in the death of Major Jas. C. Merrill, U. S. A., a prominent fellow of the Union, who died in October, and of Chester Barlow, a member, who died the present month. Mr. Barlow was also the leading spirit in the Cooper Ornithological Club of California.

The day following adjournment the members of the Union were invited by the Secretary of the Smithsonian Institution to visit the National Zoological Park, and many availed themselves of the privilege. Secretary Langley received the visitors, who were subsequently taken through the Park by Dr. Frank Baker, the Superintendent.

The question of holding a special meeting of the Union in California the coming year was referred to a committee, with power.

Following is a list of the papers read at the sessions:

GEO. SPENCER MORRIS: 'Notes on the Life of Edward Harris, with Extracts from his Journals.'

HUBERT LYMAN CLARK: 'The Development of the Pterylosis.'

JOHN N. CLARK: 'The Domestic Affairs of Bob-white.'

T. GILBERT PEARSON: 'Summer Bird Life of Eastern North Carolina.'

R. M. STRONG: 'Change of Color without Molt.'

R. M. STRONG: 'Iridescence and White Feathers.'

WALTER B. BARROWS: 'Some Problems of Local Bird Population.'

T. S. ROBERTS: 'Notes on *Picoides Americanus* and *Picoides arcticus* in Minnesota.' Illustrated with lantern slides.

FRANK M. CHAPMAN: 'Comparison of the Bird Life of Gardiners Island and Cobbs Island.' Illustrated with lantern slides.

W. L. BAILY and WM. DUTCHER: 'A Contribution to the Life History of the Herring Gull.' Illustrated with lantern slides.

J. A. ALLEN: 'The A. O. U. Check-List—its History and its Future.'

WITMER STONE: 'A Glance at the Historical side of the Check-List of North American Birds.'

E. W. NELSON: 'Evolution of Species and Subspecies as illustrated by certain Mexican Quails and Squirrels.'

H. W. OLDS: 'Form in Bird Music.'

F. A. LUCAS: 'Ancient Birds and their Associates.' Illustrated with lantern slides.

PAUL BARTSCH: 'Observations on the Herons of the District of Columbia.' Illustrated with lantern slides.

FRANK M. CHAPMAN and LOUIS AGASSIZ FUERTES: 'Bird Life in the Bahamas.' Illustrated with lantern slides.

WM. DUTCHER: 'Report of the Chairman of the Committee on the Protection of North American Birds.'

T. S. PALMER: 'Federal Game Protection in 1902.'

JONATHAN DWIGHT, JR.: 'Some Variations in the Piping Plover.' (*Ægialitis meloda*.)

WM. H. FISHER: 'Nesting of the Red-bellied Woodpecker in Harford County, Maryland.'

B. S. BOWDISH: 'Some Food Habits of West Indian Birds.'

WITMER STONE: 'The Significance of Trinomials in Nomenclature.'

ELON HOWARD EATON: 'An Epidemic of Roup in the Canandaigua Crow Roost.'

The next annual meeting will be held at the Academy of Natural Sciences, Philadelphia, commencing November 16, 1903.

JOHN H. SAGE,
Secretary.

A GRADUATE SCHOOL OF ENGINEERING RESEARCH.*

IN the charter granted to the incorporators of the Institute of Technology forty-one years ago, they and their successors were made a body corporate for the purpose of instituting a society of arts, a museum of arts, and a school of industrial science. In addition the purpose and aim of the corporation was then declared to be to aid 'generally by suitable means the advancement, development and practical application of science in connection with arts, agriculture, manufacture and commerce.'

This intention to advance and to develop the practical applications of science has

* Extract from an announcement about to be issued by the Massachusetts Institute of Technology.

been steadily kept in view, and the corporation and faculty of the Institute have striven constantly, in the four decades of its history, to advance the quality of instruction and to enlarge the facilities for laboratory practice. The curriculum of studies offered to undergraduate students of the Institute has gradually changed with the growing demands of the industrial life of the country. New engineering courses have differentiated themselves from those originally established. At its foundation the Institute offered but three distinct courses for engineers—civil, mechanical and mining engineering. To-day it offers, in addition to these, courses in electrical engineering, chemical engineering, sanitary engineering and naval architecture; and in several of these branches applications of science are employed which forty years ago were unknown. Thus biology brings to the aid of the sanitary engineer to-day a technical knowledge absolutely essential in his profession which was impossible forty years ago.

The demands of modern civilization call for engineers who can do more than keep abreast of the theory and practice of their profession. They must be able to solve new problems and to advance the state of the art in which their work lies. In applied science no less than in pure science there is need for research and for the development of the research spirit. Problems of immense practical importance are pressing for immediate solution. Such questions as the cheapening of electric power, the problem of long-distance transmission, the purification of streams and the sanitary engineering of great cities, the numerous applications of chemical engineering to the arts, furnish numerous problems of investigation whose solution affords at once the keenest intellectual exercise and the most practical and useful results. The larger industrial and manu-